No. 666,744. Patented Jan. 29, 1901.

A. L. ELLIS.

TERMINAL FOR ELECTRIC CONDUCTORS.

(Application filed Feb. 12, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1

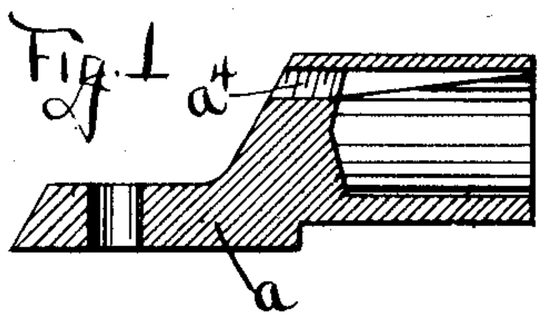
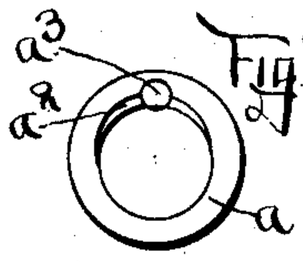


Fig. 2



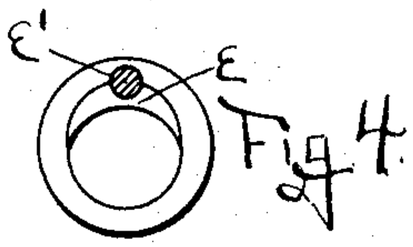


Fig. 4

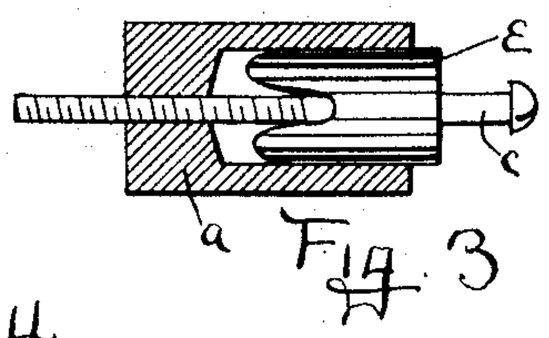


Fig. 3

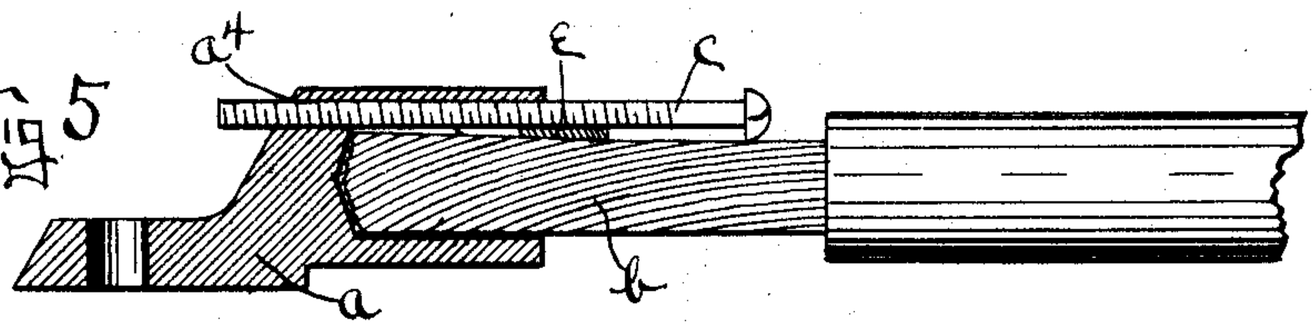


Fig. 5

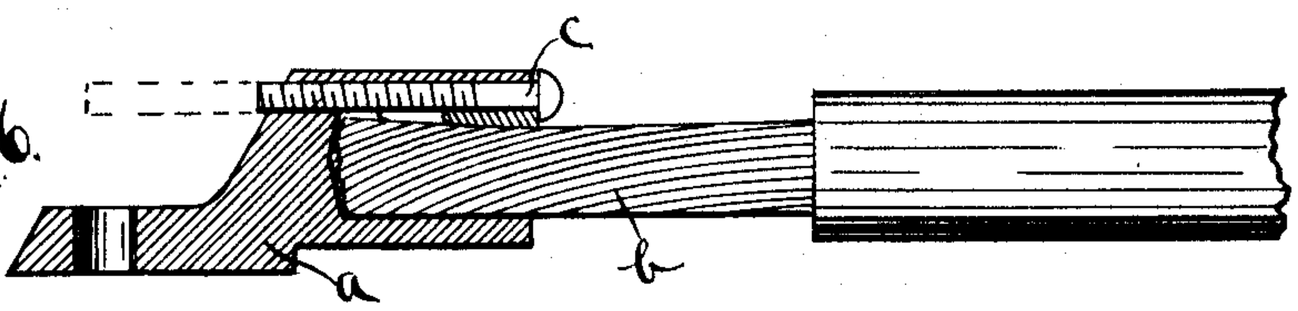


Fig. 6.

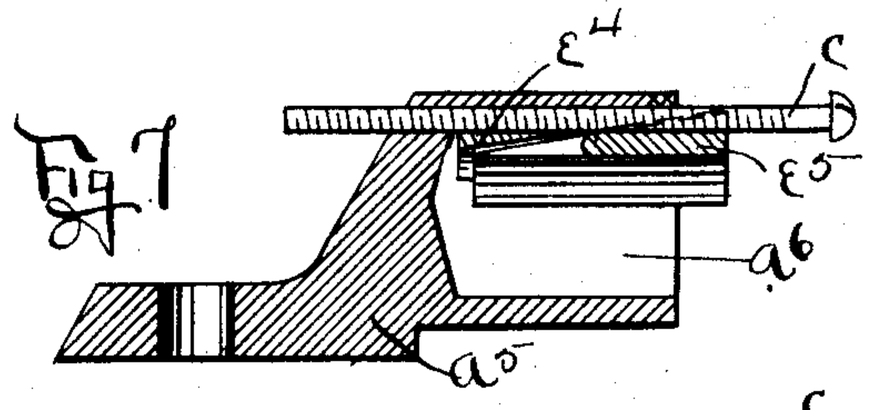


Fig. 7

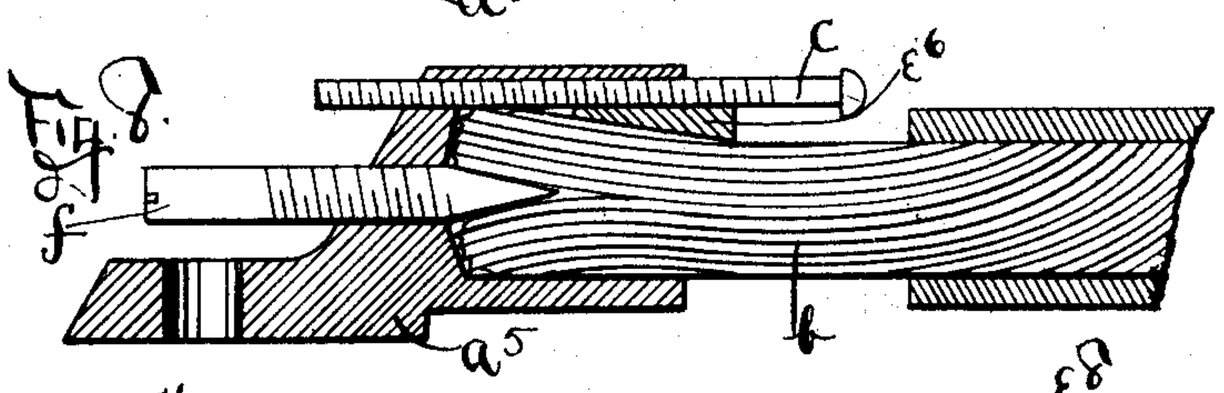


Fig. 8.

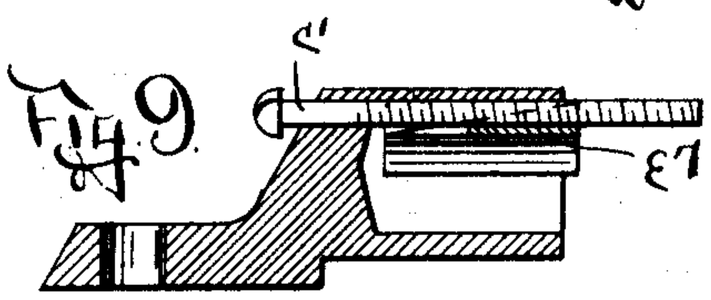


Fig. 9.

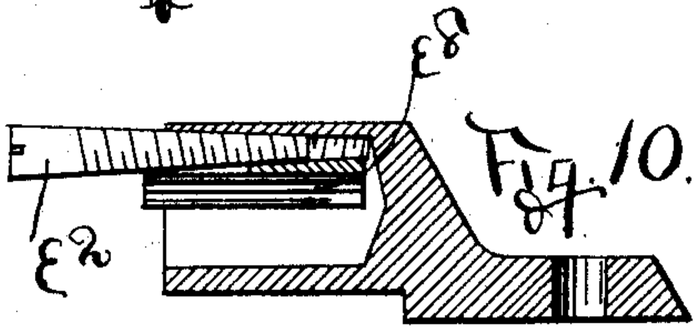


Fig. 10.

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Fig. 11.

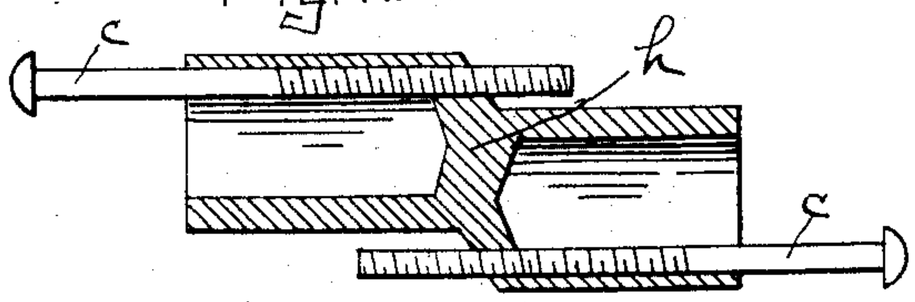


Fig. 13.

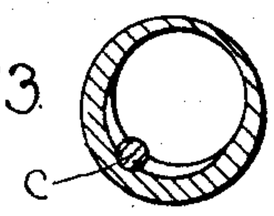


Fig. 14.

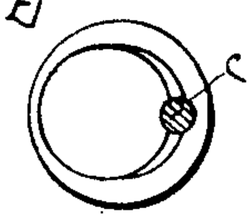


Fig. 12.

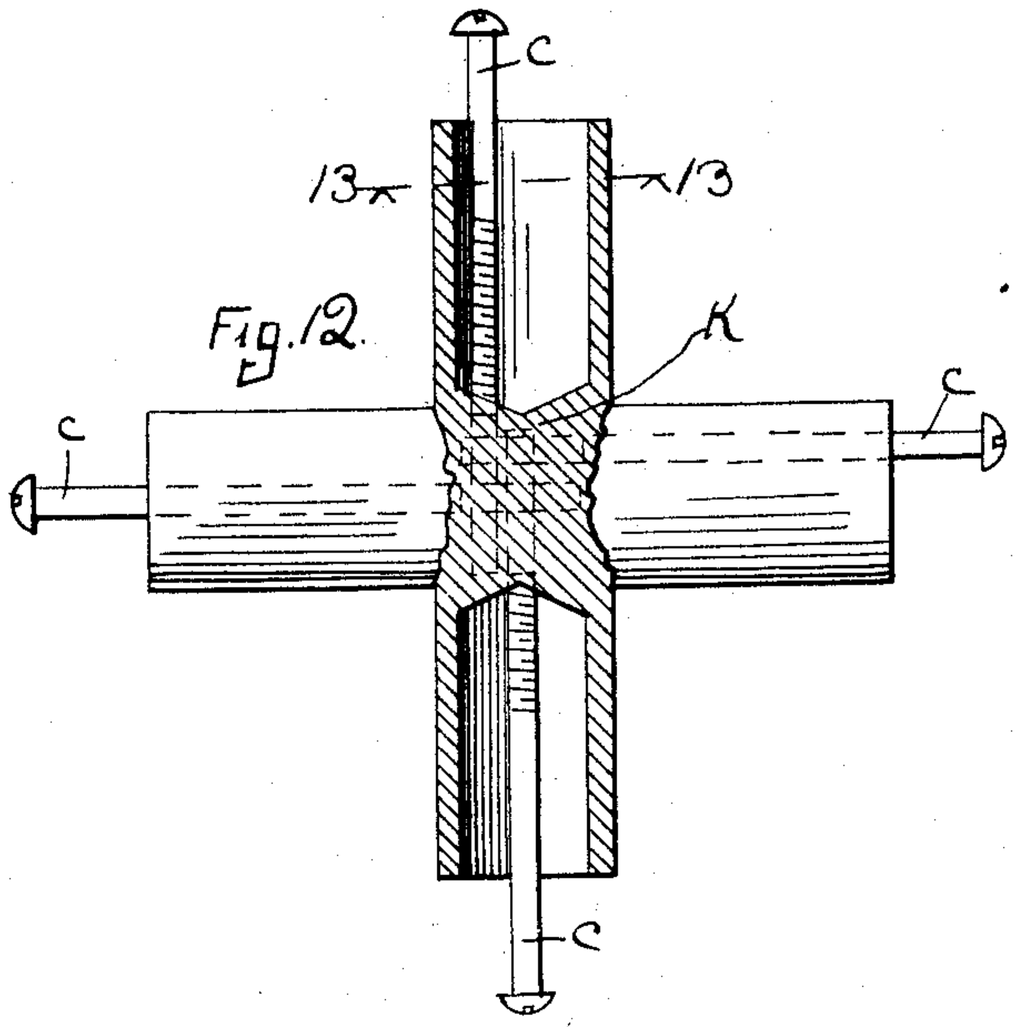


Fig. 15.

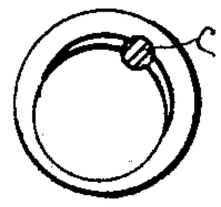
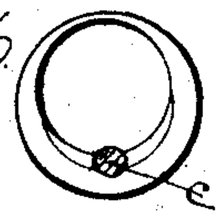


Fig. 16.



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ATTORNEYS.

UNITED STATES PATENT OFFICE.

ALVIRUS L. ELLIS, OF CHICAGO, ILLINOIS.

TERMINAL FOR ELECTRIC CONDUCTORS.

SPECIFICATION forming part of Letters Patent No. 666,744, dated January 29, 1901.

Application filed February 12, 1900. Serial No. 4,955. (No model.)

To all whom it may concern:

Be it known that I, ALVIRUS L. ELLIS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Terminals for Electrical Conductors, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to a terminal for electrical conductors, my object being to provide an improved form of device for connecting the end of a cable or other conductor with a terminal.

It has been the usual practice heretofore in connecting cables and other conductors to terminals to provide in the terminal a socket or opening in which the end of the cable is adapted to be inserted, the end of the cable or conductor being then soldered to the walls of the opening in the terminal to effect good electrical contact. In connections of this class the electrical contact between the end of the cable and the walls of the terminal must depend almost wholly upon the solder, and as the resistance at the joint is usually greater than the resistance through the conductor or through the body of the terminal the passage of the current, particularly when excessive, results in heating the metals at the joint, thereby melting the solder and destroying the effectiveness of the electrical contact, resulting in arcing and endangering the premises and frequently causing fires.

In accordance with my invention I provide an electrical terminal of any kind with a socket for the reception of an electrical conductor and associate therewith a wedging device, as hereinafter more particularly set forth. I preferably provide at one side of the socket an oblique wall, which may be formed integral with the material of the terminal or separable therefrom, and I provide a wedge, preferably concave-convex in form, adapted to be inserted between said oblique wall and the conductor, whereby the conductor is firmly secured within the socket. By making the wedge concave-convex and with feather-edges the wedge will bend to accommodate itself to the walls of the conductor as the same enters the space between the conductor and the oblique wall, thus making a perfect electrical contact between the conductor, the wedge, and the walls of the socket.

In order that the wedge may be securely maintained in position, one feature of my invention contemplates the employment of a screw or other threaded device for maintaining the wedge in the clamping position, and a further feature of my invention is the employment of a threaded device associated with the wedge in such a manner that the threaded device will serve to force the wedge into the clamping position and maintain the same in said position.

A further feature of my invention is the association with the wedging device adapted to be interposed between the conductor and the wall of the socket of a wedge adapted to enter the end of the conductor to expand the same, whereby the two wedging devices serve to securely clamp the conductor within the socket.

I have illustrated my invention in the accompanying drawings, in which—

Figure 1 is a sectional view of one form of terminal embodying my invention. Fig. 2 is an end view thereof. Fig. 3 is a sectional view on line 3 3, Fig. 2, the adjusting-screw being shown in position. Fig. 4 is an end view of the terminal, showing the wedge in position. Fig. 5 is a sectional view showing the end of the terminal in the socket. Fig. 6 is a similar view showing the connection as completed. Fig. 7 is a sectional view of a modified form of my invention. Fig. 8 is a sectional view of a further modification. Figs. 9 and 10 are views of other modifications. Fig. 11 is a view of a terminal in the form of a connector. Fig. 12 is a connector of the cross form. Fig. 13 is a sectional view on line 13 13, Fig. 12. Figs. 14, 15, and 16 are end views of the several arms.

Like letters refer to like parts in the several figures.

The terminal a is provided with an opening or socket a', adapted to receive the end of the cable or conductor b. The upper wall a^2 of the socket is shown in the present instance as oblique—that is, inclined from the outer end toward the inner end of the socket—and the socket is provided with a longitudinal channel or keyway a^3 to accommodate the adjust-

ing-screw *c*. Registering with the keyway a^3 is a tapped hole a^4, adapted to receive the threaded end of the screw *c*. Against the wall a^2 of the socket a wedge *e* is adapted to rest, the upper wall of the wedge being suitably tapered to conform to the upper wall of the socket and the wedge carrying the keyway *e'*, adapted to coact with the keyway a^3 to form a longitudinal opening for the passage of the screw *c*. The under face of the wedge *e* is suitably curved to conform to the end of the cable or conductor and is provided with thin feather-edges, whereby the curvature of the under face of the wedge may form with the curvature of the walls of the socket a suitable receptacle for the end of the cable or conductor. The end of the cable *b* being placed within the socket of the terminal, as illustrated in Fig. 5, the screw *c* is moved inward until the end thereof engages the tapped hole a^4, after which the screw is turned until the head thereof, pressing against the outer end of the wedge *e*, forces the same inward against the upper wall a^2, thereby forcing the wedge against the upper side of the cable or conductor *b* and compressing the same within the socket and forcing the outer surface thereof firmly and intimately into contact with the walls of the socket. When the screw has been moved into position to carry the wedge *e* to the proper position, the end of the screw *e* may be cut off, as illustrated in Fig. 6, the dotted lines indicating the portion of the screw which is removed. If desired, solder may be employed for assisting in providing good electrical contact between the cable and the walls of the terminal, although the solder is not essential and may be omitted, the firm mechanical contact serving to impart to the connection the desired conductivity.

In Fig. 7 I have illustrated a modification in which the socket a^6 of the terminal a^5 is provided with cylindrical walls instead of having the upper wall tapering, as illustrated in the prior figures. In this form of the device I employ two wedges e^4 e^5, the wedge e^4 having the upper face suitably formed to rest against the wall of the socket a^4 and the lower face tapering or inclined to coact with the upper face of the wedge e^5, the lower face of which is adapted to engage the face of the conductor or cable, said lower face being substantially parallel to the walls of the socket. The screw *c* is employed as before to force the wedge e^5 inward, thereby causing the same to slide upon the wedge e^4 and press the conductor against the walls of the socket.

In the structures shown in Figs. 1 and 7 the concave-convex wedge engages an oblique wall associated with the socket. This oblique wall may be formed integral with the walls of the socket, as shown in Fig. 1, or may be formed separable therefrom, as shown in Fig. 7. In each case the object of the oblique wall is to provide a guide for the wedge, which serves to force the wedge against the electrical conductor to firmly compress the same within the socket.

In Fig. 8 I have illustrated a further modification of my invention, in which the terminal a^5 is provided, as in Fig. 7, with a cylindrical socket or opening; but in this instance a single wedge e^6 is provided, the upper face of which is adapted to engage the cylindrical wall of the socket, while the lower face is suitably inclined or tapered. The screw *c* is adapted, as before, to force the wedge inward. In order to force the ends of the strands composing the cable outward into contact with the inclined face of the wedge e^6, a screw *f* is provided, fitting in a tapped hole in the rear wall of the terminal and having a pointed end, which is adapted to pass between the strands of the cable and separate the same, forcing the same outward against the walls of the socket and against the face of the wedge e^6.

In Fig. 9 I have illustrated a modification in which the screw *c'*, instead of engaging a tapped hole in the rear wall of the terminal a^6, passes freely therethrough and engages a tapped hole in the wedge e^7. By turning the screw *c'* the wedge e^7 is thus moved inward against the oblique wall of the socket to compress the end of the cable or conductor.

In Fig. 10 a tapering screw c^2 is employed, adapted to engage a tapped hole, one side of which hole is formed in the wall of the terminal, while the other side is formed in the wall of the clamping-plate e^8. By screwing the screw c^2 inward the plate e^8 is forced against the face of the cable or conductor to secure the same in position.

In Fig. 11 I have illustrated a terminal in the form of a connector adapted to join together the ends of two conductors. In this structure the two terminals constituting the connector *h* are relatively displaced laterally to permit the locking-screws *c c* freedom of movement.

In Figs. 12 to 16, inclusive, I have illustrated a conductor *k* in the form of a cross having four arms k' k^2 k^3 k^4, whereby the ends of the four conductors may be electrically joined. The walls of the sockets are preferably formed eccentric, as illustrated in the end views, and the screws *c c* of the opposite sockets are relatively displaced laterally, as illustrated, whereby the tapped holes of the sockets may be made of the requisite depth. The screws of one pair of oppositely-placed sockets are situated at one side of the connector, while the screws of the other sockets are situated at the opposite side, as will more fully appear from an examination of the end views. Where it is desired to employ a connector in the form of a T, one of the arms illustrated in Fig. 12 may be omitted. Likewise the double connector of the class illustrated in Fig. 11 may be made, as shown in Fig. 12, by omitting the arms on either side. Again, if it be desired to connect more than four con-

ductors a greater number of arms may be employed to accommodate the number of conductors to be connected.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a terminal having a socket or receptacle for the reception of an electrical conductor and having at one side an oblique wall, of a concave-convex wedge having feather-edges and adapted to be inserted between the conductor and said oblique wall, substantially as described.

2. The combination with a terminal having a socket or receptacle for the reception of an electrical conductor, of a part adapted to rest against the wall of the socket at one side and having an inner oblique wall, and a concave-convex wedge having feather-edges and adapted to be inserted between the conductor and said oblique wall, substantially as described.

3. The combination with a terminal having a socket or receptacle for the reception of an electrical conductor, of a wedging device adapted to be inserted between the conductor and the wall of said socket, and a screw or threaded part extending substantially parallel to said conductor and having a part for engaging said wedging device to force the same between the conductor and the wall of the socket, substantially as described.

4. The combination with a terminal having a socket or receptacle for the reception of an electrical conductor, of a concave-convex wedging device having feather-edges and adapted to be interposed between said conductor and the wall of the socket, and a threaded part associated with said wedging device for moving and locking the same into position, substantially as described.

5. The combination with a terminal of conducting material having a socket or receptacle for the reception of an electrical conductor, of a concave-convex wedge of the same or similar conducting material having feather-edges and arranged to be interposed between said conductor and the walls of the socket to compress the conductor and force the same into intimate contact with the terminal while preserving the form of the conductor, substantially as described.

6. The combination with a terminal having a socket or receptacle for the reception of an electrical conductor, of a wedging device interposed between said conductor and the walls of the socket, and a threaded part independent of and separate from the conductor for moving and locking said wedging device into position, substantially as described.

7. The combination with a terminal having a socket or receptacle for the reception of an electrical conductor, of a screw engaging a tapped hole in the end of said socket, and adapted to enter the end of the conductor to expand the same, substantially as described.

8. The combination with a terminal having a socket or receptacle for the reception of an electrical conductor, of a part adapted to be inserted between said conductor and the wall of the socket and a wedge provided at the end of said socket and adapted to enter the end of the conductor to expand the same, substantially as described.

9. The combination with a terminal having a socket or receptacle for the reception of an electrical conductor, of a wedging device between said conductor and the walls of the socket, said socket being provided with a tapped hole and a screw engaging said tapped hole and having a shoulder adapted to engage and move said wedging device into the clamping position, substantially as described.

In witness whereof I have hereunto subscribed my name in the presence of two witnesses.

ALVIRUS L. ELLIS.

Witnesses:
W. CLYDE JONES,
M. R. ROCHFORD.